



A Better 9th Grade:
Early Results from an
Experimental Study of
the Early College
High School Model

“Having all the people around you who genuinely care and know who you are, and are backing you 100% on your road to success, and graduation eventually. It’s really motivating. It’s just an experience that I’m sure that if everyone had the opportunity to take and realize, the world would be a different place.”

– ECHS Student

Overview

To increase the number of students graduating from high school prepared for college, North Carolina has established the largest number of Early College High Schools (ECHS) in the United States. Early results from a rigorous, independent study of North Carolina’s initiative have shown that these schools have substantial positive impacts on student performance. Specific findings include:

- More ECHS students were **on-track for college** than control group students.
- The ECHS model appears to be **closing the performance gap** among student sub-groups.
- Students in the ECHS were **less likely to be suspended** and were **absent fewer days**.
- ECHS students reported **higher levels of academic engagement**.
- ECHS students reported **more positive school experiences** than students in the control group, including **better relationships, higher expectations, more rigorous and relevant instruction, and more academic and social support**.

This brief gives an overview of the model as implemented in North Carolina, the study’s design, and ECHS’ impacts on grade 9 students.

The Problem

Too many students are not graduating from high school, and even among those who do, many are not prepared for postsecondary education and the world of work. More than 60 percent of employers rate students’ basic skills as “fair” or “poor,”¹ and over 40 percent of students enrolled in postsecondary education took remedial coursework.² In North Carolina, less than three-fourths (72 percent) of students graduate from high school on time,³ and only 19 percent graduate from a four-year college within 10 years of entering high school.⁴

Ninth grade is a critical year for students, when student academic performance and student attendance generally decline.⁵ A higher number of students are retained in 9th grade than in any other high school year, resulting in a 9th grade bulge. A large percentage of students leave school between the 9th and 10th grade.⁶ Students who do not do well in 9th grade are more likely to drop out of school, even if they did well in 8th grade.⁷ Finally, what students do and learn in 9th grade is critically important if they are to graduate prepared for college and work.

Researchers have found that students who do not complete Algebra I and English I by the end of grade 9 are not likely to graduate with the coursework needed for college. For example,

a study that looked at high school transcripts in California found that, of the students who did not complete Algebra I by the end of grade 9, only an estimated 6 percent completed the courses necessary for college by the end of grade 12.⁸ In other words, once students fell off the college prep track (which supplies the coursework needed for college), they were highly unlikely to get back on it. As a result, having access to and successfully completing core grade 9 courses such as Algebra I and English I are key to helping ensure students meet the requirements for college.

The Schools

In response to the above concerns, North Carolina established a public-private partnership to create new and redesigned high schools. Led by the North Carolina New Schools Project and funded by the North Carolina General Assembly with additional support from the Bill & Melinda Gates Foundation, this partnership has supported the North Carolina Early College High School Initiative.⁹ Early college high schools are small schools, most often located on college campuses, serving students in grades 9-12 or 9-13.¹⁰ The goal of these schools is to increase the number of students graduating from high school who are prepared for college and work. At the end of their high school experience, students

are expected to graduate with a high school diploma and an associate's degree or two years of transferable college credit. The target populations for these schools are students who are traditionally underrepresented in college, including students who are low-income, are the first in their family to go to college, or are members of a minority group underrepresented in college.

In North Carolina, ECHSs are required to follow a set of five core design principles:

- **Ready for College**—Schools are to establish an environment that supports college readiness for all students. They do this through a required college preparatory curriculum, access to college courses, counseling for college admissions, and other college readiness activities, such as explicit instruction in college behavior and expectations.
- **Powerful Teaching and Learning**—ECHSs are expected to incorporate rigorous and relevant instructional and assessment practices.
- **Personalization**—Schools are to foster strong and positive relationships between students and staff and provide individualized academic and social support to help students achieve in a more challenging academic environment.
- **Professionalism**—Schools are expected to create an environment that empowers teachers and supports professional development and collaboration.
- **Purposeful Design**—As these are schools that serve fewer than 400 students and that are located on college campuses, ECHSs have the flexibility to utilize time and other resources in a way to support the other design principles.

Early college high schools are intended to implement the design principles in a comprehensive manner so that more students stay in school and graduate ready for college.

The Study

Funded through a federal grant from the Institute of Education Sciences, this five-year study is the first to rigorously examine the impact of the early college high school model. The study is a collaborative effort led by SERVE Center at the University of North Carolina at Greensboro, working with the North Carolina New Schools Project, the North Carolina Department of Public Instruction (NCDPI), Duke University, Abt Associates, and RTI International.

Comparing apples to apples

This study is different from most studies in education because it uses an experimental design, often called the “gold standard” for determining the effectiveness of a program because students are randomly assigned to a treatment and control group. Here, when participating schools had more applicants than they had spots, a lottery was used to pick the students. A lottery is often considered the fairest way to allocate scarce resources. One group, the study's treatment group, was randomly selected in the lottery to attend the Early College. The other group, the study's control group, was not selected in the lottery and, thus, went somewhere else, most often to the regular district high school. Students in the two groups, treatment and control, should have the same background characteristics such as incoming achievement, motivation, and demographic characteristics. The only difference between the two groups would then be whether or not students attend ECHSs; this means you are comparing results for two groups that are the same—apples to apples. Any difference in outcomes could be considered to be an impact of ECHS because the students were randomly selected to attend the school.

The study has three main goals:

1. Examine the impact of the ECHS model on student outcomes including: attitudes, attendance, achievement, course-taking, and school leaving/dropout rates.
2. Determine whether the impact varies by student characteristics, such as: race/ethnicity, poverty status, and first generation college status.
3. Determine whether specific program components are associated with better student outcomes.

Methods

In this longitudinal experimental study, participating ECHSs used a lottery to select students from their applicant pool. The study team used data collected by NCDPI on measures such as attendance, test scores, suspensions and expulsions, and dropout status, as well as an original survey to track outcomes for students who were and were not admitted to ECHS.¹¹ Information on implementation was collected through student and staff surveys and site visits.

Sample: For the results presented in the brief, the analyses were conducted on data collected by NCDPI for 718 9th graders in eight cohorts in six ECHSs and associated control schools. The team also collected original survey data for one cohort of 574 9th graders in 10 sites.¹² The treatment and control students were statistically comparable on the majority of baseline characteristics. A slightly higher percentage of students in the control group were previously retained, and students in the treatment group had slightly higher 8th grade math performance. The final impact analyses account for these differences.

Results

Ninth grade outcomes indicate that ECHSs were meeting their goal of increasing college readiness and establishing a more positive school environment. Specifics on the key findings appear below.

Finding 1: More ECHS students were on-track for college.

The ECHS study found that ECHS students were enrolling in and successfully completing Algebra I at a higher rate compared to control group students. Figure 1 shows that, by the end of 9th grade, 97 percent¹³ of ECHS students had taken Algebra I compared to 76 percent of the control group. However, taking courses is only part of the equation—schools must also ensure that students succeed in these courses. Figure 1 also shows that 81 percent of the students in the ECHS successfully completed¹⁴ Algebra I by the end of 9th grade

compared to 67 percent of the control group. The data in this figure include any pre-existing differences between the two ECHS and control groups and also include students who took Algebra I in 8th grade.¹⁵ When those differences are taken into account and when we account for the fact that students are clustered together in schools, we find that the difference between ECHS and control students is 11 percentage points in Algebra I course-taking and 6 percentage points in Algebra I success.

Algebra I is only the first in a set of math courses required for college. The set also includes Geometry, Algebra II, and one math course beyond Algebra II. When we look at findings relative to the number of these courses taken, we find that statistically significantly more ECHS students were taking and succeeding in college preparatory mathematics courses. Figure 2 shows that, by the end of 9th grade, virtually all of the ECHS students had taken at least one college preparatory

Figure 1: Algebra 1 Taking and Success

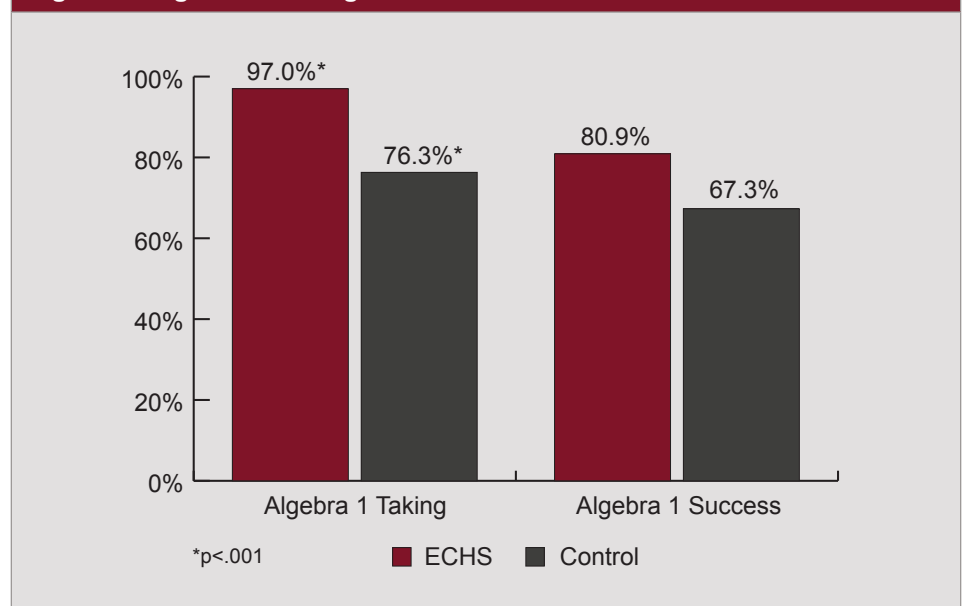
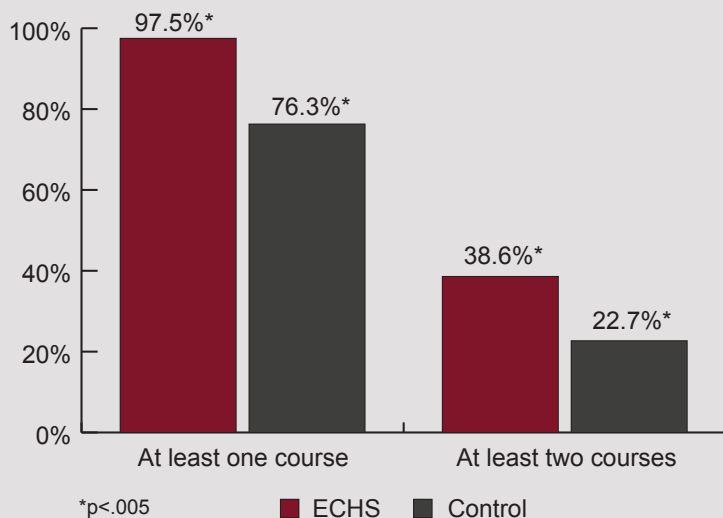


Figure 2: Impact on College Prep Course Taking



mathematics course, compared to around three-quarters of the control group. This finding is particularly compelling because it shows that almost one-quarter of students who applied to the ECHS but were not randomly selected and thus attended a different school did not take the classes they needed to be on track for college by the end of 9th grade.

The other core 9th grade course is English I. We found that the ECHSs had slightly higher course taking and completion rates, although these differences were not statistically significant. By the end of 9th grade, 96 percent of ECHS students had taken English I, and 87 percent had successfully completed it, compared to 93 percent and 83 percent in the control group.

Overall, the ECHS model is having a positive impact on students' preparation and readiness for college, particularly in the area of math. The next finding looks at these impacts for specific target populations.

Finding 2: The ECHS model appears to be closing the performance gap among sub-groups in two 9th grade courses.

The ECHS model is aimed at students who are underrepresented in college: those eligible for free or reduced-price lunch, those who would be the first in their family to attend college, and those who are members of racial and ethnic groups underrepresented in college (African-American, Hispanic, and Native American). Results from the study show that the ECHS model appears to be reducing some gaps

that occur between members of target populations and other students. For example, Table 1 shows how the gaps between the percentages of minority and non-minority students successfully completing Algebra I and English I were smaller in the ECHS than in the traditional high school. The ECHS group showed no differences in English I completion rates and only two percentage points separating minority and non-minority students' completion rates in Algebra I. In comparison, the control group had gaps of approximately 14 percentage points between minority and non-minority groups in the control group in Algebra I and 9 percentage points in English I.¹⁶ For these two courses, the ECHSs have essentially no access and success gap for minority students.

Finding 3: Students in the ECHS were less likely to be suspended and were absent fewer days.

The study also looked at the number of students who had been suspended and the number of days of school missed for both ECHS and control students.

During their 9th grade year, 3 percent of the ECHS students had been suspended at least once compared

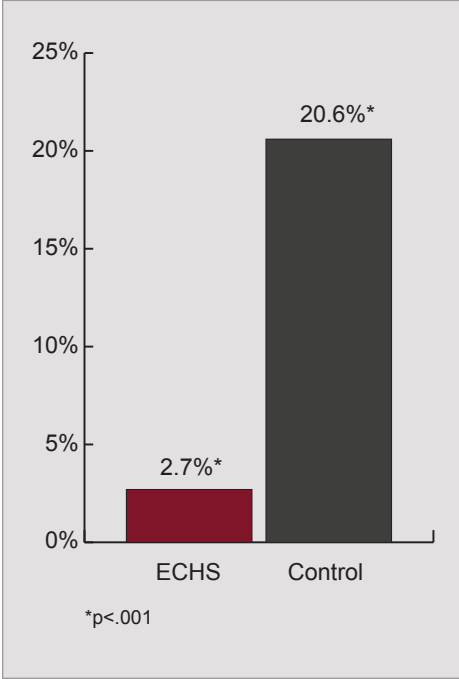
Table 1: Gaps in Successful Completion Rates in Algebra I and English I — Minority vs. Non-Minority Students

	Successful Completion of Algebra I			Successful Completion of English I		
	Minority	Non-Minority	Gap	Minority	Non-Minority	Gap
ECHS	79.4%	81.5%	-2.1%	87.4%	87.4%	0%
Control	57.3%	70.9%	-13.6%	76.5%	85.7%	-9.2%

“I like how they play on our strengths and weaknesses because the teachers, they don’t focus like, ‘Oh, you need to know this for the test.’ They’re more focused on what you’re going to retain and know in the long run. I really like that because I like to learn. I want to know something.”

– ECHS Student

Figure 3: Percent Suspended in 9th Grade



to 21 percent of the control group (see Figure 3). When pre-existing differences and clustering are taken into account, the impact was 13 percentage points.

For attendance, both groups had similar numbers of excused absences (2.86 for the ECHS and 2.94 for the control), but ECHS students had significantly fewer unexcused absences. The ECHS students had an average of 3.85 unexcused absences compared to 6.41 in the control group (the adjusted impact was 1.5 days, a difference that was statistically significant at $p<.05$).

Finding 4: ECHS students reported higher levels of academic engagement.

The study also examined the impact of ECHS participation on students’ attitudes and behaviors. Results from a survey administered to both treatment and control students showed that 9th grade ECHS students reported being more actively engaged in school-related activities than students in the control group, a statistically significant difference (effect size of .23). ECHS students were more likely to respond that they were likely to do things such as ask questions and contribute to class discussions, work with classmates outside of class, and meet with their instructors to discuss their learning. This finding is particularly important, since high school teachers often struggle to motivate and engage their students. There was a negative impact in the area of self-efficacy in English-Language Arts, with ECHS students reporting statistically significantly lower feelings of self-efficacy (effect size of -.21). There was no difference in mathematics self-efficacy.

Finding 5: ECHS students were more likely to report positive school experiences than students in the control group.

Results from student surveys showed that ECHS students reported more positive school experiences than students in the control group on all dimensions examined, with all differences statistically significant. ECHS students reported that their teachers had much higher expectations for students. Similarly, they indicated a more challenging high school experience and significantly more positive relationships with their teachers. ECHS students also reported participating in a higher level of rigorous and relevant instruction. Finally, more ECHS students reported receiving more types of academic and social-emotional support activities more frequently. Table 2 shows the effect sizes for each of the scales examined. Effect sizes are measures of how big the difference between the two groups is in terms of standard deviation units. The Institute of Education Sciences regards effect sizes of +0.25 or higher as potentially substantively important in education studies. Using this guideline, all of these effect sizes can be viewed as being substantively important in terms of impacts on students’ academic experiences.

“Teachers are more willing to stop if one student doesn’t understand something and work with that student while still trying to emphasize the point with the other students to help everyone get it. I guess that’s the biggest difference I saw from other schools I’ve been to; that it’s a close relationship with the teachers, and you don’t have to be afraid to ask questions here.”

– ECHS Student

Table 2: Impact of ECHS on Student Experiences	
Scale	Effect Size
Academic and Social Support	.95*
High Expectations	.66*
Rigorous Instruction	.52*
Relevant Instruction	.43*
Relationships	.35*
Challenge	.31*

*Significant at $p \leq .001$.

Conclusions

According to 9th grade results from this rigorous, experimental study, North Carolina’s Early College High Schools are creating more positive school environments for students resulting in improved attendance, reduced suspensions, and increased numbers of students on-track for college. These schools are also successfully expanding the initial part of the college preparatory pipeline for students of all backgrounds.

As this study continues, more schools and students will be included in the sample. This will allow us to determine if these results hold true across more schools. In addition, the research team will follow the students to look at the impact of the model on students’ success in upper grades, as well as the impact on students’ dropout rates.

For more information about the study, please contact Julie Edmunds, the study’s director, at SERVE Center at the University of North Carolina at Greensboro: 336-574-8727 or jedmunds@serve.org.

This material is based upon work supported by the Institute of Education Sciences under grant number #R305R060022. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the Institute of Education Sciences.

Footnotes

1. American Diploma Project (2004). *Ready or not: Creating a high school diploma that counts*. Washington, DC: Achieve, Inc.
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9. For more information about Early College High Schools in North Carolina, please visit the North Carolina New Schools Project at www.newschoolsproject.org. Please note that there are Early College High Schools in North Carolina that are not a part of this initiative.
10. Some schools include a thirteenth grade in order to give students time to complete all of the required credits.
11. An important note about the sample: this study uses an intent-to-treat approach, which means that any student who was originally assigned to the treatment group remains in that group, even if he or she did not enroll in the ECHS or left it at any point. This means that the study’s findings are not affected by attrition from the ECHS. It also means that we are likely underestimating the model’s impact because results are included for students who were no longer attending the ECHS.
12. This analysis includes administrative data only through the 2007-08 school year since there is a delay in processing the data. The survey data includes data from 2007-08 and from 2008-09, which allows us to include more sites.
13. The percentages reported in this brief are all unadjusted, which means that they do not take into account any initial, pre-9th grade differences between students in the two groups. In addition, they do not account for the fact that students are clustered in schools. We do take both these situations into account when we are making statements about the overall program impact. For that reason, the reported adjusted differences will vary from the differences between the unadjusted group means.
14. Because the research team does not have access to course grades, successfully completing the course is indicated by students taking and passing the mandated End-of-Course exam. It should be noted that the rates reported here are not traditional pass rates, which reflect only the percentage of students who passed the test out of the ones who took the test. Instead, these figures look at the total number of 9th grade students; doing this allows us to incorporate both access to courses and success in those courses into our measures.
15. All of the math coursetaking findings include students who may have taken Algebra I or other high school courses in middle school. We chose to report these results because it allows us to look at the proportion of the entire population of students who are taking the courses they need to be on-track for college. We get similar results if we look only at the students who had not taken Algebra I prior to 9th grade.
16. These proportions are unadjusted means, and we have not tested these differences for statistical significance.

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